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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,928	01/11/2005	Yoshihiro Izumi	1035-561	4954
23117	7590	06/15/2006	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			KUNZER, BRIAN	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/520,928

Applicant(s)

IZUMI, YOSHIHIRO

Examiner

Brian Kunzer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 14-33 is/are pending in the application.
- 4a) Of the above claim(s) 22-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 14-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-8 and 14-33 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendments

Applicant's amendment in the reply filed on February 27th, 2006 has been received and entered. In summary, claims 9-13 are cancelled, claims 1-3, 7, 16 and 20 have been amended, and new claims 22-33 have been added.

Election/Restrictions

1. Newly submitted claims 22-33 are directed to an invention that is independent or distinct from the invention originally claimed (claims 1-8 and 14-21) for the following reasons:

This application contains claims directed to the following patentably distinct species:

- I. Claims 1-8 and 14-21, Group I, drawn to a photoelectric conversion device, classified in class 257, subclass 225.
- II. Claims 22-33, Group II, drawn to an array of charge transfer devices containing thin film transistor(s) and a photodiode, classified in class 257, subclass 233, 258.

The species are independent or distinct because they are classified in separate subclasses and Group I fails to mention any inclusion of thin film transistors/photodiodes. Currently, there is no generic claim.

Since applicant has received an action on the merits for the originally presented invention (claims 1-8 and 14-21), this invention has been constructively elected by original presentation for prosecution on the merits. **Accordingly, claims 22-33 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.**

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 7, 16, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7, 16, and 20 recite the limitation of a conversion layer that “converts non-visible radiation into light.” This limitation is indefinite because of the use of the term “converts” which has the meaning to change something into another form or state. However, use of the word “converts” implies that there is a difference (in form, state, etc.) between non-visible radiation and light, when there is not. The spectrum of light may be categorized into two regions; that of

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the visible region (wavelength of 375~740nm) and anything outside this region categorized as non-visible (encompassing radio, micro-, infrared, ultraviolet, x, and gamma rays). As best understood by examiner, applicant has meant to say "converts non-visible radiation into visible light" as is detailed in the specification. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 5, 6, 8, 14, 15, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Choo (US Patent No. 6,617,584).

With respect to claim 1, Choo teaches, from fig. 7 (column 6 lines 1-26), a photoelectric conversion device, comprising: a first insulating layer (68 and 72), formed so as to cover a photoelectric conversion element (formed from 58, 64, 56, and 60) and a connection electrode (90) that are formed on a substrate (51), where the first insulating layer (68 and 72) has an opening portion (78a) extending to the connection electrode (90); and a conductive layer (80, mislabeled on fig. 7, see fig. 9G) formed on the first insulating layer (68 and 72), wherein the conductive layer (80) is formed so as to be connected via the opening portion (78a) to the

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connection electrode (90) and wherein the connection electrode is provided in a periphery of an active area.

With respect to claim 2, Choo teaches, from fig. 7 (column 6 lines 1-26), a photoelectric conversion device, comprising: a first insulating layer (68 and 72) formed so as to cover a photoelectric conversion element (formed from 58, 64, 56, and 60) formed on a substrate (51); and a conductive layer (80, mislabeled on fig. 7, see fig. 9G) formed on the first insulating layer (68 and 72), wherein the conductive layer (80) is formed so as to be connected to a connection electrode (90), formed on the substrate (51), via an exposing portion (78a) provided on at least part of an end face on an outer boundary of the first insulating layer (top surface of layer 72) in order to expose at least a part of the connection electrode (90).

With respect to claims 5 and 14, both claims having similar subject matter, Choo teaches, from fig. 7, the photoelectric conversion device wherein the first insulating layer (68 and 72) includes: an inorganic insulating film (68) formed so as to cover the photoelectric conversion element (formed from 58, 64, 56, and 60); and an organic insulating film (72) formed on the inorganic insulating film (68). (Also see column 7, lines 44-46 and 59.)

With respect to claims 6 and 15, both claims having similar subject matter, Choo teaches, from fig. 7 (See column 6, line 4), the photoelectric conversion device further comprising a second insulating layer (82) formed on or above the conductive layer (80, mislabeled on fig. 7, see fig. 9G), which is formed on the first insulating layer (68 and 72).

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With respect to claims 8 and 17, both claims having similar subject matter, Choo teaches an image scanning apparatus, comprising the photoelectric conversion device wherein the photoelectric conversion device is used as an image scanning sensor (Specifically, for use as an X-ray imager, see background of the invention and fig. 6).

4. Claims 3, 4, 18 and 21 are rejected under 35 U.S.C. 102^b(e) as being anticipated by Ikeda (US Patent No. 6,323,490).

With respect to claim 3, Ikeda teaches, from fig. 69 (column 38, lines 10-43), a photoelectric conversion device, comprising: a first insulating layer (4314 and 4310) formed so as to cover a photoelectric conversion element (formed from 4316, 4312, 4309, and 4304) formed on a substrate (4301) and a pixel capacitor section (formed from 4315, 4307, and 4305) connected to the photoelectric conversion element (through 4315); and a conductive layer (4311) formed on the first insulating layer (4314 or 4310), wherein a thickness of the first insulating layer (4314 or 4310) is thinner in an area positioned on or above the pixel capacitor section, in which capacitor electrodes overlap, than in another area.

With respect to claim 4, Ikeda teaches, from fig. 69 (column 38, lines 10-43), the photoelectric conversion device wherein: the first insulating layer (4314 or 4310) includes an insulating protective film (4310 made of a silicon nitride film, see column 38, line 32), formed so as to cover the photoelectric conversion element (formed from 4316, 4312, 4309, and 4304), which protects the photoelectric conversion element, and the first insulating layer has a relative

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dielectric constant which is higher in the insulating protective film (4310) than in a portion (4314 made of an organic benzocyclobutene, see column 38, line 31-32) other than the insulating protective film. (Note that silicon nitride films have higher dielectric constants than benzocyclobutene resins.)

With respect to claim 18, Ikeda teaches, from fig. 69, the photoelectric conversion device wherein the first insulating layer (4314 and 4310) includes: an inorganic insulating film (4310) formed so as to cover the photoelectric conversion element (formed from 4316, 4312, 4309, and 4304); and an organic insulating film (4314) formed on the inorganic insulating film (4310). (Also see column 38, line 31-32.)

With respect to claim 21, Ikeda teaches an image scanning apparatus, comprising the photoelectric conversion device wherein the photoelectric conversion device is used as an image scanning sensor (Specifically, for use as an X-ray imager, see background of the invention and fig. 73).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 7, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choo (US Patent No. 6,617,584) and Ikeda (US Patent No. 6,323,490) as applied to claims 1, 2, and 3 above, and further in view of Hamamoto (US Patent No. 6,800,836).

With respect to claims 7, 16, and 20 both claims having similar subject matter, as best understood by examiner, Choo and Ikeda do not specifically teach the photoelectric conversion device further comprising a conversion layer, which is formed on or above the conductive layer formed on the first insulating layer, which converts non-visible light into visible light. Although, Ikeda does teach in fig. 15, a conversion layer (202) that converts X-rays into charges. Note that it is inherent for a photoelectric conversion device to operate with some sort of conversion layer when dealing with high-energy (ultraviolet, x-ray, gamma) light imaging.

However, Hamamoto, drawn to X-ray image processing systems, teaches, from fig. 4, a conversion layer (3, a scintillator) placed on a photoelectric conversion device that converts incoming X-rays into visible light.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have the devices of Choo or Ikeda utilizing the conversion (scintillator) layer of Hamamoto because a conversion layer is required to prevent damage to the pixel cell array from high energy radiation such as X-rays or ultraviolet light.

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda-490 as applied to claim 3 above, and further in view of Choo-584.

Ikeda teaches the device of claim 3 as stated above.

Ikeda does not teach that there is a second insulating layer on the conductive layer.

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However, Choo teaches, from fig. 7 (See column 6, line 4), a photoelectric conversion device further comprising a second insulating layer (82) formed on or above the conductive layer (80, mislabeled on fig. 7, see fig. 9G), which is formed on the first insulating layer (68 and 72).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to make the device of Ikeda utilizing the second insulating layer of Choo because the insulating layer functions to isolate added conductive layers and also serves as a protective coating to ensure electrical connections against environmental harm in further production steps (cleaning, etching, etc.).

Response to Arguments

7. Applicant's arguments filed February 27, 2006 have been fully considered but they are not persuasive.

Applicant amended claim 1 by adding the limitation "and wherein the connection electrode is provided in a periphery of an active area." However, this does not overcome the 35 U.S.C. 102(e) rejection of claim 1 since the electrode (90) is provided in a periphery (outer region) of an active region (i.e source (58), channel (64), and drain (60)).

Applicant amended claim 2 by adding limitations (underlined) into "via an exposing portion (78a) provided on at least part of an end face on an outer boundary of the first insulating layer." However, this does not overcome the 35 U.S.C. 102(e) rejection of claim 2 since the exposing portion (78a) is provided on at least part of an end face on an outer boundary (i.e. insulating layer (72) has a top surface which serves as an end face on an outer boundary) of the first insulating layer.

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In regards to the 35 U.S.C. 102(e) rejection of claim 3, Applicant makes the following argument:

With respect to the thickness of the insulating layer, Applicant submits that the capacitor section in Figure 69 of Ikeda et al. is formed by electrode 4305 and the portion of the source electrode 4315 spaced apart therefrom by insulating layer 4307. Insulating layers 4310 and 4314 are not thinner above this capacitor section as compared to other areas. Claim 3 particularly specifies that the thickness of the first insulating layer is thinner in an area positioned above the pixel capacitor section, in which capacitor electrodes overlap, than in another area. No such arrangement is disclosed by Ikeda et al. Consequently, Applicant respectfully submits that Ikeda et al. does not anticipate claim 3.

Applicant is referred (fig. 69) to the first insulator (4310) region over stopper layer (4312) which is thicker in this area than in the thinner insulator (4310) region above the capacitor electrode (4305). Regardless of this fact, Examiner contends that some regions outside of the area depicted in fig. 69 would inherently have thicker insulator layers (4310 or 4314) where no electrodes/transistors are formed on the substrate. Furthermore, fig. 70 shows a thinning of the insulator (4314) over the capacitor electrode (4305).

In regards to the 35 U.S.C. 103(a) rejection of claims 7, 16, and 20, Applicant makes the following argument:

Both Choo et al. and Ikeda et al. are directed to X-ray detectors (see, e.g., Choo et al., Abstract; Ikeda et al., Abstract). One skilled in the art would assume that the devices of Choo et al. and Ikeda et al. are suitable for detecting X-rays without modification and so would not be motivated to further modify them to detect X-rays. Because the devices of Choo et al. and Ikeda et al. are designed to receive X-ray radiation and not visible light, converting the X-ray radiation into visible light would likely prevent the proper functioning of Choo et al. and Ikeda et al.

Examiner agrees with the Applicant in the respect that Choo and Ikeda function as X-ray detectors; however, Examiner contends that the devices of Choo and Ikeda inherently have some sort of X-ray conversion layer (in this case, charge conversion layers), since one of ordinary skill

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in the art knows that the photoelectric devices will not work or are too sensitive to be bombarded directly with high energy radiation such as X-rays. The Hamamoto reference was supplied to supplement this position that a scintillator can be used in conjunction with a photoelectric device (charge coupled device (CCD), photodiode, etc.) in order to produce an electric signal. Indeed, the background of the Invention of Hamamoto makes this clear.

Finally, claims 7, 16, and 20 were rejected under 35 U.S.C. 112, second paragraph, in response to the amendment made (the details of which are given above).

Conclusion

8. Applicant's amendment necessitated any of the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Kunzer whose telephone number is (571) 272-5054. The examiner can normally be reached on Monday-Friday 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BK
6/2/06



ANH D. MAI
PRIMARY EXAMINER